

CERTIFICATION

REPUBLIC OF GABON _____)
REGION DE L'ESTUAIRE _____)
LIBREVILLE _____) ^{ss:}
AMERICAN EMBASSY _____)

I, Ross S. Douthard, Vice-Consul of
the United States of America at LIBREVILLE, GABON, duly commissioned and
qualified, do hereby certify that the annexed copy of a Memorandum of
understanding on a Joint Program for Solar Photovoltaic Power is
a true and faithful copy of the original exhibited before me this day,
the same having been carefully examined by me and compared with the said original
and found to agree therewith word for word and figure for figure.

IN WITNESS WHEREOF I have hereunto set my hand and affixed the seal of the
Embassy of the United States of America at LIBREVILLE GABON,
this 6th day of February, 1982.



Ross S. Douthard

MEMORANDUM OF UNDERSTANDING

BETWEEN


THE MINISTRY OF ENERGY AND HYDRAULIC RESOURCES
OF THE REPUBLIC OF GABON

AND

THE UNITED STATES DEPARTMENT OF ENERGY

FOR

A JOINT PROGRAM OF DEMONSTRATION OF SOLAR
PHOTOVOLTAIC POWER IN GABON



Article 1: Purpose

The Ministry of Energy and Hydraulic Resources (MERH) of the Republic of Gabon, and the United States Department of Energy (DOE), have agreed to conduct a 3-year joint solar energy program to demonstrate the technical, economic, and social value of photovoltaic power systems in assisting development and improving the quality of life in rural areas of Gabon. This joint Program is limited to four selected public service sector applications and to four villages. This Memorandum of Understanding sets out the understanding of the Parties named above with respect to the undertaking of the Program described below.

Article 2: The Program

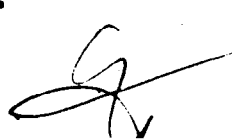
The program has three complementary activities: (1) the demonstration of the use of photovoltaic power in rural development in Gabon; (2) training to develop Gabonese capability in the technology and application of photovoltaics; and (3) the evaluation of the technical, economic and social aspects of the demonstration. The attachment entitled "The Program" amplifies the above Program definition. Within the limits of the above Program definition, elements of the description contained in the attachment may be changed by mutual written agreement of the Project Coordinators without formal amendment of this Memorandum of Understanding.

Article 3: Financial Arrangements

The cost of the program should not exceed \$1,600,000 (U.S. Dollars) allotted as follows:

- \$1,000,000 for equipment and for services outside of Gabon. These expenditures will be borne equally by Gabon and the United States up to \$500,000 for each of the two Parties. However, if the program should be expanded by mutual agreement of the Parties, it is understood that the U.S. and Gabon will share equally in the increased cost.
- \$600,000 for the drilling of wells, and services within Gabon. This expense will be borne entirely by the Republic of Gabon.

In addition, it is understood that Gabon and the U.S. will each bear the costs associated with their respective civil service personnel assigned to manage and support the Program, including the cost of salaries, benefits, travel and subsistence. No portion of the \$1,000,000 Program resources will be used for travel and subsistence expenses except those associated with training as defined in the attachment.




Funding for the Program will be transferred to the U.S. National Aeronautics and Space Administration by MERH as soon as practicable after this agreement has been signed. The terms and conditions for the transfer of funds from MERH to NASA and the establishment of a Deposit Account shall be outlined in a separate agreement between the Parties or their designees. It is understood that the ability of the Parties to carry out their obligations under this agreement is subject to the availability of appropriated funds.

Article 4: Program Responsibilities

I. Responsibilities of DOE

DOE, under an existing interagency agreement with NASA, will delegate responsibility to the Lewis Research Center (LeRC) to use its best efforts to accomplish the following activities:

- a) Conduct site visits to each of the villages to define the photovoltaic power system requirements.
 - b) Implement Phase I, System definition, including conceptual design, cost analysis and preparation of specifications, requests for proposals and bidding documents.
 - c) Implement Phase II of the village energy demonstration including award and implementation of a contract for the design fabrication, checkout, installation and monitoring of the solar photovoltaic power systems.
 - d) Provide information for selected Gabonese personnel who are at the policy level with an emphasis on what photovoltaics can contribute to Gabon's rural development and future energy needs and its present and projected cost; and training at the technical level with an emphasis on the technology, its cost, application and system features.
 - e) Support MERH in the evaluation of technical and economic aspects of the Program as mutually agreed.
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II. Responsibilities of MERH

MERH, for its part, will use its best efforts to carry out the following responsibilities:

- a) Support DOE, as mutually agreed, in the implementation of the village energy demonstration Phases I and II including site visits.
- b) Select appropriate personnel in Gabon at both the policy level and technical level for training in photovoltaic renewable energy.
- c) Conduct an evaluation of the technical, economic, and social aspects of the role of photovoltaic renewable energy technology in supporting rural development in Gabon.

III. Joint Responsibilities

Detailed description, plans, schedule, and resource requirements for the Program shall be outlined in an Implementation Plan to be jointly developed by the Project Leaders.

Article 5: Liability

DOE and the MERH agree that, with respect to injury or damage to persons or property involved in operations undertaken pursuant to this agreement, neither DOE, nor the MERH shall make any claim with respect to injury or death of its own or its contractor's or its subcontractor's employees or damage to its own or its contractor's or its subcontractor's property caused by activities arising out of or connected with this project, whether such injury, death or damage arises through negligence or otherwise.

Compensation for damages incurred by other persons or property during the implementation of this agreement shall be in accordance with the applicable laws of the countries of the Parties.

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Article 6: Management

(a) DOE and MERH shall each designate a Project Coordinator to act on its behalf in all matters concerning cooperation under this Memorandum of Understanding. All decisions shall be by unanimity.

(b) Overall responsibility for annual review, approval and oversight of the Program's technical content and budget will rest jointly with the Project Coordinators.

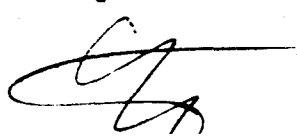
(c) Each Party shall appoint a Project Leader for the detailed Management of this Project. The Project leaders shall be responsible to their respective Project Coordinator for the working contacts between Parties. In accordance with the DOE/NASA MOU dated June 23, 1975, as amended March 21, 1978, NASA has designated the NASA LeRC as Project Leader for the U.S.

(d) The Project will be managed and implemented on a day-to-day basis by the Project Leaders. The Project Leaders will undertake the tasks as set forth in the Implementation Plan. The Project Leaders may request DOE's assistance in identifying administrative and technical support as necessary to assure timely execution of the Project in accordance with unanimous approval of the Project Coordinators.

(e) The Project Leaders will provide reports to their respective Project Coordinators in accordance with the accepted procedures in that country, which will note the status of the Project with respect to schedules, milestones, and budgets.

Article 7: Reporting

Semi-annual reports shall be prepared jointly by the Project Leaders continuing for a period of three years. For two more years the MERH shall provide annual reports to the U.S. project coordinator covering the work done, system performance, results achieved, funds expended and milestones completed.



Article 8: Disputes

Any dispute in the interpretation or implementation of the terms of this Memorandum of Understanding shall be referred to the signatories of this Memorandum of Understanding.

Article 9: Exchange of Staff

Whenever an exchange of staff is contemplated under this Agreement, each Party shall ensure that qualified staff are selected for attachment to the other Party. Each party shall be responsible for the salaries, insurance and allowances to be paid to its staff. Each Party shall pay for the travel and living expenses of its staff while on attachment to the host Party unless otherwise agreed. Each Party shall provide all necessary assistance to the attached staff of the other Party as regards administrative formalities (travel arrangements, hotel reservations, etc.). The staff of each Party shall conform to the general and special rules of work and safety regulations in force at the host establishment.

Article 10: Scientific Equipment

All Parties agree that in the event scientific equipment (e.g., meteorological instruments and insolinometers) is to be exchanged or supplied by one Party to another, the following provisions shall apply covering the shipment and use of agreed equipment:

1. The sending Party shall supply as soon as possible a detailed list of the equipment to be provided together with the relevant specifications and technical and other documentation.
2. The equipment and necessary spare parts supplied by the sending party for use in joint projects shall remain its property and shall be returned to the sending Party upon completion of the mutually agreed upon activity unless otherwise agreed. The host establishment shall provide the necessary premises for the equipment in accordance with technical requirements which shall be as mutually agreed.



3. The equipment provided by the sending Party for carrying out mutually agreed upon activities shall be considered to be scientific, not having a commercial character.

4. The receiving Party shall be responsible for safekeeping and insurance en route from authorized port of entry to the ultimate destination and return.

Article 11: Public Information

Release of public information regarding this Program may be made by either of the Parties after suitable consultation with the other Party.

Article 12: Customs and Visas

The Parties will endeavor to arrange for free customs clearance for all equipment required for this Program. The U.S. and Gabon each will use its best efforts to facilitate the issuance of visas for the personnel of the other side, including contractors participating in the Program.

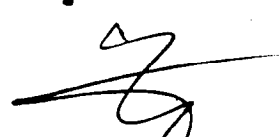
Article 13: Amendments

Either of the Parties may propose to the other amendments to this Memorandum of Understanding in writing. Agreements on such amendments shall be established by the Parties in the form of annexes to this Memorandum of Understanding.

Article 14: Entry Into Force and Duration

This Memorandum of Understanding shall enter into force upon signature and shall remain in force for a period of three (3) years, at which time the Program objectives are expected to have been met except for reporting requirements.

The Memorandum of Understanding may be extended by mutual agreement in writing and may be terminated in whole or with respect to any area of cooperation under this Memorandum of Understanding at any time at the discretion of either of the Parties upon one-hundred-twenty (120) days advance notification in writing.



Article 15: Other Agreements

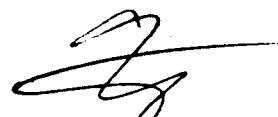
The Provisions of this Agreement shall not affect the rights or duties of the Parties under other agreements or arrangements. This Agreement also in no way precludes commercial firms or other legally constituted enterprises in each of the two countries from engaging in commercial dealings in accordance with the applicable laws of each country; nor does it preclude the Parties from engaging in activities with other governments or persons.

Article 16: Laws and Regulations

Activities under this Agreement shall be in accordance with laws and regulations of the countries of the Parties. All questions related to the Agreement shall be settled by the Parties by mutual agreement.

Article 17: Information and Intellectual Property

- (a) Right to Publish. Subject only to copyright and patent restrictions, the Parties shall have the right to publish all information provided to or arising from this Memorandum of Understanding except pre-existing proprietary information.
- (b) Reports on Work Performed Under this Memorandum of Understanding. The Project Coordinators shall jointly provide reports of all work performed under this Memorandum of Understanding and the results thereof, including studies, assessments, analyses, evaluations, other documentation, and pre-existing proprietary information, to the Parties.
- (c) Pre-existing Proprietary Information. The Parties shall take all necessary measures in accordance with this paragraph, the laws of their respective countries and international law to protect pre-existing proprietary information provided under this Memorandum of Understanding. For the purposes of this Memorandum of Understanding, proprietary information shall mean information of a confidential nature such as trade secrets and know-how (for example, computer programs, design procedures and techniques, chemical composition of materials, or manufacturing methods, processes, or treatments) which is appropriately marked, provided such information:



- (1) Is not generally known or publicly available from other sources;
- (2) Has not previously been made available by the owner to others without obligation concerning its confidentiality; and
- (3) Is not already in the possession of the recipient Party without obligation concerning its confidentiality.

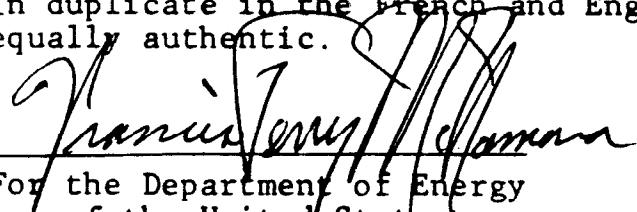
It shall be the responsibility of either Party supplying pre-existing proprietary information to identify the information as such and to ensure that it is appropriately marked.

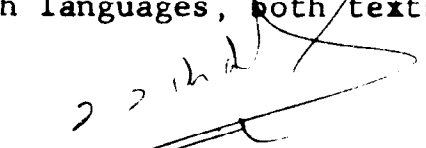
(d) Copyright. Either of the Project Coordinators may take appropriate measures necessary to protect copyrightable material generated under this Memorandum of Understanding. Either Project Coordinator may obtain copyrightable material, provided that, both Parties may reproduce and distribute such material, but neither Party shall publish such material with a view to profit, except as otherwise agreed by the Parties.

(e) Arising Inventions. Inventions made or conceived in the course of or under this Memorandum of Understanding (arising inventions) shall be owned by MERH in Gabon and by DOE in the United States and in third countries.

(f) Additional Provisions. Any other issues concerning the publication, distribution, handling, protection, and ownership of information and intellectual property arising from this Memorandum of Understanding shall be determined by the Parties acting in conformity with this Memorandum of Understanding. Each Party shall take all necessary steps to provide the cooperation from its inventors and authors required to carry out this Article. Each Party shall assume the responsibility to pay awards or compensation to be paid to its own nationals according to its own laws.

Done this 4th day of February, 1982,
in duplicate in the French and English languages, both texts being
equally authentic.


For the Department of Energy
of the United States
of America
Ambassador of the United States
to Gabon
Francis Terry McNamara


For the Ministry of Energy
and Hydraulic Resources
of Gabon
The Minister
D. Divungi-Di-Ndinge

The Program

A. Background



The U.S. Department of Energy (DOE) is pursuing a National Photovoltaic Conversion Program aimed at developing cost-competitive photovoltaic power systems. This program has been divided into several areas of responsibility, one of which is the Photovoltaic Stand-Alone Applications Project which is managed for the DOE by NASA-Lewis Research Center (LeRC) in Cleveland, Ohio, under IA No. DE-A101-79ET-20485. The objectives of the Photovoltaic Stand-Alone Applications Project are (1) to develop and demonstrate, in partnership with users, stand-alone applications which represent a potentially large market and (2) to develop the supporting system and component technology.

The Republic of Gabon is actively pursuing programs of rural development to improve the quality of life and increase the economic productivity in rural areas. In this regard, the Republic of Gabon is interested in the practical applications of solar photovoltaic energy in meeting a number of primary needs of rural development.

At the invitation of the Minister of Energy and Hydraulic Resources, Republic of Gabon, two NASA-Lewis Research Center representatives visited Gabon on February 12-20, 1980, for discussions of a possible joint, cost-shared demonstration of photovoltaic applications for rural villages. Subsequently, on March 3, 1980, President Omar Bongo, President, Republic of Gabon, in a letter to the U.S. Ambassador to Gabon, indicated his interest in proceeding with photovoltaic demonstrations in four villages to supply electricity for the following public services: health, education, water supply and area lighting.

B. Program Description: Goal and Purpose

The goal of the Program is to demonstrate the technical, economic, and social value of photovoltaic power systems in assisting development and improving the quality of life in rural areas of Gabon. The scope of the Program is limited to four selected public service sector applications and to four villages and should be viewed as a verification activity precedent to the eventual large-scale purchase, from sources not limited to a single supplier, and deployment of solar photovoltaic systems in Gabon's rural development programs.



The Program will be designated to demonstrate the capability of photovoltaic power to meet minimal energy needs for the following important public sector applications: health, education, water supply, and area lighting.

The specific purposes of the Program are to provide information to Gabonese policy-makers that will assist them in decisions concerning the large-scale adoption of this renewable energy technology in rural development and to support the objectives of the U.S. National Photovoltaic Conversion Program which is directed to developing cost-competitive energy systems through market stimulation.

C. Sub-Program 1 - Village Energy Demonstration

The objective of this program element is to demonstrate the capability of photovoltaic technology to supply the energy required for specific public service sectors in rural areas of Gabon.

Four villages situated in different provinces have been selected by the Government of Gabon as demonstration sites. The villages and respective provinces are:

Bougandji (Haut-Ogooue)
Nyali (Nyanga)
Donguila (Estuaire)
Bolossoville (Woleu N'tem)


There will be four public service applications powered by photovoltaic systems. Program responsibility will embrace both the photovoltaic power supply and the associated electrical loads. The application/site and the respective electrical loads are as follows:

Health/Dispensary - lighting, ventilation, and a medical refrigerator;

Education/School - lighting and audio-visual teaching equipment;

Water Supply/TBD - water pump, storage and distribution system (excluded is well drilling and casing);

Area Lighting/TBD - outdoor pole light.



The demonstration will be conducted in two phases. Phase I, System Definition, will involve conceptual design, cost analysis, and preparation of specifications, requests for proposals and bidding documents. This phase will include site visits to each of the villages by a team of experts to define requirements. Phase II will cover the award and implementation of a contract for the design, fabrication, checkout, installation, and monitoring of the solar photovoltaic power systems.

Detailed description, plans, schedule, and resource requirements for this element of the Program will be incorporated in the Implementation Plan.

D. Sub-Program 2 - Training

There is a growing interest in alternative, renewable energy sources in Gabon, on the part of policy makers and technical personnel. This interest is found within the Ministry of Energy and Hydraulic Resources, as well as in the Ministries in charge of Health, Telecommunications, and Agricultural Development. It is recognized that there is a need for a better understanding of the technologies involved, their economics, and their practical application.

The need for training in photovoltaic renewable energy exists at two levels: at the policy level, there is a need to develop an appreciation of what photovoltaics can contribute to Gabon's rural development and future energy needs, as well as understanding of present and projected costs. At the technical level, engineers, economists, and various development officials need a complete understanding of the technology, its cost, application, and system features.

E. Sub-Program 3 - Evaluation

The objective of this portion of the Program is to provide an evaluation of the role of photovoltaic renewable energy technology in supporting rural development in Gabon.

To provide the necessary information for the evaluation, assessments will be carried out during the course of the Program on pertinent technical, economic and social aspects of the Program. Three assessments are identified at this time:



- (1) Village Level, Socio-Economic Assessment by the MERH;
- (2) PV System Technical Assessment by NASA LeRC; and
- (3) Study of the Economic/Financial Implications of the Large-Scale Introduction of PV Systems in Gabon by NASA LeRC and MERH.

Detailed description, plans schedule, and resource requirements will be incorporated in the Implementation Plan.

F. Implementation Plan

The purpose of the Implementation Plan is to document and describe for this joint Program, the activities to be carried out and provide the necessary detailed plans, schedules, and resource requirements. The following will be covered in the Implementation Plan:

- (1) Village Energy Demonstration Plan;
- (2) Training Plan;
- (3) Evaluation Plan;
- (4) Management Plan;
- (5) Procurement Plan;
- (6) Schedules; and
- (7) Resources Plan.

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